Written Reply

To Mr. Masanori Tachibana, Examiner at the Patent Office

1. Identification of the International Application

PCT/JP03/12464

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5. Contents of Reply:

(1) We have received the opinion in accordance with §13 Japanese Law Concerning the International Application of the Patent Cooperation Treaty and Related Matters (PCT rule 66) indicating the lack of inventive step of alls claims in the above-identified application (hereinafter referred to as the present application), and would like to reply as follows. The invention of

the present application is as recited in the claims at the time of the international application.

(2) The Examiner stated concerning claims 1 to 10 of the present application as follows: "it would have been easy for a person skilled in the art to, in the optical information recording media provided with n information layers described in document 1 (JP 2002-251778) and document 2 (JP 2002-133712), reduce the light transmittance of the information layers sequentially from a light beam incident side as described in document 3 (JP 9-7274), document 4 (JP 2002-50053) and document 5 (JP 2002-117585) and further it is a well-known technology that the transmittance of a TeO recording layer changes depending on a concentration of oxygen atoms contained as described in document 6 (JP 60-131650), and it would have been obvious for a person skilled in the art to apply this well-known technology to the technology of documents 1 to 5. Therefore, claims 1 to 10 of the present application do not have inventive step over documents 1 to 6".

However, the Applicant cannot agree with the Examiner's statement, and would like to state as follows so as to explain that the invention of the present application has inventive step over documents 1 to 6.

(3) Regarding the invention of the present application:

The optical information recording medium of the invention according to claim 1 of the present application is characterized in that "an optical information recording medium comprises: a substrate; and at least n information layers (where n is an integer of at least 3) provided on the substrate, wherein each of the n information layers comprises a recording layer comprising Te, O and M, where M denotes at least one element selected from the group consisting of Al, Si, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn,

Ga, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, In, Sn, Sb, Hf, Ta, W, Re, Os, Ir, Pt, Au and Bi, and when the n information layers are represented as a first to a n-th information layers from a laser beam incident side, assuming that C(j)% denotes a concentration of oxygen atoms contained in the recording layer included in a j-th information layer (where j is an integer satisfying $1 \leq j \leq n-1$), C(1) to C(n−1) satisfy the following relationships:

$C(1) \geq C(2) \geq \ldots \geq C(n-2) \geq C(n-1)$, and $C(1) \neq C(n-1)$."

The optical information recording medium of the invention according to claim 5 of the present application is characterized in that "an optical information recording medium comprises: a substrate; and a first information layer and a second information layer provided in this stated order from a laser beam incident side on the substrate, wherein each of the first information layer and the second information layer comprises a recording layer comprising Te, O and M, where M denotes at least one element selected from the group consisting of Al, Si, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, In, Sn, Sb, Hf, Ta, W, Re, Os, Ir, Pt, Au and Bi, and a concentration of oxygen atoms contained in the recording layer included in the first information layer is larger than a concentration of oxygen atoms contained in the recording layer included in the second information layer."

The optical information recording media of the invention according to claims 1 and 5 (hereinafter called "the present invention") have the above-stated configurations, and therefore each of the laminated information layers can realize a favorable recording sensitivity and a high C/N ratio. Furthermore, in addition to a favorable recording sensitivity and a high C/N ratio for each information layer, the optical information recording media of the present invention further can realize another effect of making it easier to let the plurality of laminated information layers have

a uniform recording sensitivity and such a reflectivity. Incidentally, this effect is described in page 18, lines 10 to 20 and in page 19, lines 18 to 24 (page 16, lines 3 to 19 and page 17, line 20 to page 18, line 1 in the English specification) as well as Table 2 and Table 3 in the originally filed Japanese specification.

(4) Comparison of the present invention with the cited references:

Documents 1 and 2 disclose an optical information recording medium in which a plurality of information layers including a recording layer containing Te, O and M are laminated.

Documents 3 to 5 disclose that it is preferable, in the configuration in which a plurality of information layers are laminated, to reduce the light transmittance of the information layers sequentially from a light beam incident side.

Document 6 discloses that a transmittance increases with an increase in a concentration of oxygen atoms contained in a TeOx recording layer, and a recording sensitivity becomes better with a decrease in a concentration of oxygen atoms contained therein (i.e., Te-richer composition). The optical information recording medium disclosed in document 6, however, is not directed to a multilayered structure including a plurality of information layers laminated, but has a feature of the concentration of oxygen atoms being varied continuously in one TeOx recording layer. Therefore, in the invention disclosed in document 6, there is no need to make it easier to let the plural information layers in a laminated state have a uniform reflectivity and such a recording sensitivity as in the present invention. Therefore, document 6 does not disclose or suggest the relationship between the film composition of a recording layer and the reflectivity and the light absorption coefficient. It should be note that the

recording sensitivity depends not only on the thermal physical properties of a recording film as described in document 6, but also on the light absorption coefficient or the like. Thus, in order to make it easier to allow the plural laminated information layers to have a uniform recording sensitivity, consideration should be given also to a relationship between the film composition of a recording layer and the light absorption coefficient, etc.

The Examiner judged that it would have been easy for a person skilled in the art to apply the relationship of transmittances of the respective information layers described in documents 3 to 5 to the optical information recording media disclosed in documents 1 and 2. The Examiner further judged that it would have been obvious for a person skilled in the art to control the concentration of oxygen atoms contained in order to control the light transmittance of an information layer by applying the technology described in document 6. The Applicant of the present application, however, does not consider that a person skilled in the art could have easily arrived at the present invention by simply applying the technology described in document 6 to the optical information recording medium that is obtained by combining documents 1 to 5. As described previously, the present invention has a configuration in which a plurality of information layers are laminated, and therefore it is required for the respective information layers to have a similar recording sensitivity and reflectivity. As described above, document 6 does not describe or suggest the configuration in which a plurality of information layers are laminated, and therefore naturally document 6 does not disclose or suggest the relationship between the film composition of a recording layer and the light absorption coefficient, which is to be considered for the case where a plurality of information layers are laminated. Thus, we do not consider that it would have been easy for a person skilled in the art to simply apply

the matter described in document 6 to the multilayer structured optical information recording medium that is obtained from documents 1 to 5. Furthermore, according to document 6, as the composition contains more Te (i.e., Te-richer composition), a change in optical properties due to a phase change (crystallization) becomes larger. Therefore, it can be considered that a C/N ratio accordingly becomes larger. From this, in a TeOx recording layer, when a concentration of oxygen atoms contained is changed, a C/N ratio is changed accordingly. On the other hand, according to the present invention, approximately similar C/N ratios can be obtained among the plurality of information layers in which concentrations of oxygen atoms contained are changed (See page 19, lines 18 to 20 and page 22, lines 17 to 19 of the originally filed Japanese specification (page 17, lines 20 to 23 and page 20, lines 17 to 20 in the English specification), as well as Tables 3 and 5). Conceivably, this results from the recording layers in the optical information recording medium of the present invention being different from the recording layer of document 6 in that the recording layers of the present invention contain M as a third element in addition to Te and O. That is to say, the present application disclosed for the first time that similar C/N ratios can be obtained in the recording layers having the composition as used in the present invention, even when concentrations of oxygen atoms contained are changed. Therefore, we do not believe that a person skilled in the art could have easily arrived at the present invention by applying document 6 to the optical information recording medium obtained from documents 1 to 5.

For the above-stated reasons, it would not have been obvious for a person skilled in the art to combine the technology described in document 6 with the optical information recording medium obtained from documents 1 to 5, and we believe that the invention according to claims 1 and 5 has

inventive step over documents 1 to 6.

Furthermore, claims 8 and 9 of the present application are directed to a method for manufacturing the optical information recording media of claims 1 and 5, and therefore we believe that these have inventive step over documents 1 to 6 for the same reasons as stated above. Moreover, claims 2 to 4, 6, 7 and 10 of the present application are dependent on any one of claims 1, 5, 8 and 9. As described above, claims 1, 5, 8 and 9 have inventive step over documents 1 to 6. Therefore, we believe that these claims naturally have inventive step over documents 1 to 6.

For the above-stated reasons, we believe that the invention of claims 1 to 10 has inventive step over documents 1 to 6.